



**Air Quality Permitting
Technical Memorandum**

TIER II Operating Permit No. 059-00007

**IDAHO POWER COMPANY, INC.
SALMON SUBSTATION
SALMON, IDAHO**

Prepared by:

**Michael Stambulis
Air Quality Engineer, Associate**

January 8, 2002

FINAL PERMIT

PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.404.04 (*Rules for the Control of Air Pollution in Idaho*) [Rules] for Tier II operating permits and to document the factual basis for issuing this operating permit.

PROJECT DESCRIPTION

This project is for the issuance of a Tier II operating permit (OP) for the Idaho Power Company, Inc. (Idaho Power) Salmon Substation located on St. Charles Street in Salmon, Idaho. The Range-Township location is the northern half of Section 5, Township 21 North, Range 22 East.

The emissions sources at this facility are two diesel-fired electrical generators, two 12,000-gallon above ground storage tanks (ASTs) containing either No. 1 or No. 2 distillate (diesel) fuel, and fugitive dust generated from vehicular traffic on the facility's unpaved roads.

Two 2.75-megawatt (MW) generators were installed in 1967 to serve as standby power sources should the only transmission line to the area fail. These units, combined with other units, were capable of carrying most or the entire electrical load in the town of Salmon, if needed. Recently, the other generating units were retired leaving the two 2.75-MW generators as the only standby power sources. A second transmission line provides additional service to the area; however, the electrical load in Salmon has grown significantly. Although the two remaining generators can no longer carry the full load of the town, they are an important factor in maintaining service in support of the main transmission lines into Salmon. Idaho Power would like to permit these generators to carry more of the base load to support local voltage. According to Idaho Power, the two 2.75 MW diesel-powered generators have not been modified, or their capacity increased, since installation.

Summary of Events

On May 1, 2001, the Idaho Department of Environmental Quality (DEQ) received a permit to construct (PTC) application from Idaho Power for the two generators located at the Salmon Substation.

On June 6, 2001, DEQ met with Idaho Power to discuss the PTC application. Idaho Power and DEQ reached an understanding that the PTC would be determined incomplete, and Idaho Power would submit a Tier II OP application containing additional information to be specified in the incompleteness letter.

On June 7, 2001, DEQ issued a letter indicating the PTC application was incomplete.

On August 9, 2001, Idaho Power submitted a Tier II OP application. Within this application, Idaho Power requested a draft copy of the Tier II OP prior to issuance.

On September 10, 2001, DEQ issued a letter indicating the Tier II OP application was complete.

A public comment period was held between December 6, 2001 and January 7, 2002. No comments were received by DEQ.

Discussion

1. Equipment Listing

Each generator's rated maximum capacity is 2.75 MW, and they will operate on either No. 1 or No. 2 diesel fuel. The maximum hourly combustion rate is approximately 200 gallons per hour. Listed below are the exhaust gas stack parameters for each generator:

Generator West

Stack Height Above Ground = 20 feet
Effective Stack Diameter = 2.67 feet
Exhaust Flowrate = 33,836 actual cubic feet per minute (acfm)
Exhaust Temperature = 684°F

Generator East

Stack Height Above Ground = 20 feet
Effective Stack Diameter = 2.67 feet
Exhaust Flowrate = 33,388 acfm (average of range provided)
Exhaust Temperature = 725°F

In addition, there are two 12,000-gallon ASTs containing either No. 1 or No. 2 diesel fuel at the facility.

2. Emissions Estimates

Air pollution emission rates from each generator were calculated using results from source testing performed by Bison Engineering, Inc. on June 13 and 14, 2001. Idaho Power submitted a report with the Tier II OP application that summarized the source testing. A discussion of the source test used to establish emission factors is included in Appendix A.

Listed below are hourly and annual emissions from Generator West and Generator East. Hourly emissions are based on both generators operating at full capacity. Annual emissions were estimated using the maximum fuel consumption and emissions from Generator West as a worst-case scenario. The maximum annual fuel usage is 392,392 gallons of diesel fuel, respectively, during a 12-month period. The annual fuel usage limits were established to ensure the annual emissions of nitrogen dioxide are below the 100 ton per year threshold for Title V sources.

Emissions estimates of nitrogen oxides (NO_x), sulfur dioxide (SO₂), particulate matter with a mean aerodynamic diameter of 10 micrometers or less (PM₁₀), and carbon monoxide (CO) were calculated using emissions factors taken from the source test results. United States Environmental Protection Agency (EPA) Air Pollution Emission Factors (AP-42 emissions factors) were used to estimate emissions of toxic air pollutants (TAPs). All calculations assume a maximum of 1,960 combined hours per 12-months of operation for the generators, and no additional control of emissions. Please refer to Appendix B for details regarding the ambient air concentration calculations.

Table 1: Criteria Air Pollutant Emissions for Two Generators

Pollutant	Emissions rates based upon source testing performed on June 13 & 14, 2001	
	(lb/hr) ¹	(T/yr) ²
Nitrogen Oxides	198.1	99.2
Carbon Monoxide	41.8	23.4
Sulfur Oxides	12.6	6.4
PM ₁₀ ³	8.1	4.9

1. lb/hr = pounds per hour; emissions rates represent maximum hourly emissions from simultaneous operation of both generators.
2. T/yr = Tons per year; emissions rates represent maximum annual emissions from both generators.
3. PM₁₀ = condensable and filterable particulate matter; PM emissions calculated from source test were assumed to be PM₁₀.

Please refer to the spreadsheet printout in Appendix B to review the emissions estimates for this project. Appendix B includes emissions estimates of TAPs and criteria air pollutant emissions from the generators.

In addition, emission rates were calculated from the two 12,000-gallon ASTs at the facility using EPA's Tanks 4.0 volatile organic chemical (VOC) emission calculation program. A copy of the program's output is presented in Appendix C. Total annual VOC emissions from both ASTs were calculated to be 9.82 pounds per year. Emissions from the ASTs were negligible; therefore, emissions from the ASTs are not regulated in the OP.

3. Modeling

Idaho Power used the ISCST3 model, an approved regulatory model, to assess the ambient air quality impacts. The operating scenario modeled was for both generators operating at full capacity as worst case. Another important point is that all sulfur oxide (SO_x), particulate matter (PM), and NO_x emissions were modeled assuming that all SO_x was emitted as SO₂, all PM was emitted as PM₁₀, and all NO_x was emitted as NO₂. These are worst-case assumptions. The ambient impacts from operation of two generators at the Salmon Substation are given in Table 2 below:

Table 2: Criteria Air Pollutant Ambient Impacts

	SO ₂ ¹			PM ₁₀ ²		CO ³		NO ₂ ⁴
	3-Hour (µg/m ³) ⁵	24-Hour (µg/m ³)	Annual (µg/m ³)	24-Hour (µg/m ³)	Annual (µg/m ³)	1-Hour (µg/m ³)	8-Hour (µg/m ³)	Annual (µg/m ³)
A	191.8	34.76	1.14			1,038.88	319.37	18.0
B	374	120	18.3	86	32.7	11,450	5,130	40
C	566	155	19.4			12,489	5,449	58
D	1,300	365	80	150	50	40,000	10,000	100

A. Modeled Ambient Concentration

B. Background Concentration

C. Modeled Ambient Concentration plus Background Concentration

D. National Ambient Air Quality Standards (NAAQS) for SO₂, PM₁₀, NO₂, and CO

1. SO₂ = sulfur dioxide

2. PM₁₀ = particulate matter with a mean aerodynamic diameter of ten micrometers or less

3. CO = carbon monoxide

4. NO₂ = nitrogen dioxide

5. µg/m³ = micrograms per cubic meter

Emissions of TAPs from the generators were evaluated and determined to be below the state standards. Emissions of benzene, formaldehyde, and benzo(a)pyrene were above the toxic screening levels listed in IDAPA 58.01.01.586. The emission rates for each of the other toxic air pollutants emitted by the generators were below screening thresholds specified by IDAPA 58.01.01.585 and 586. Refined modeling was conducted to determine ambient concentrations of benzene, formaldehyde, and benzo(a)pyrene. The ambient impacts for the TAPs are below the acceptable ambient concentrations listed in IDAPA 58.01.01.586. Since the acceptable ambient concentrations listed in IDAPA 58.01.01.586 are based on an excess risk of one in a million, the risk for this facility-wide analysis is acceptable.

A discussion of the modeling results used to establish the ambient impacts of the generators at this site may be seen in Appendix D, and a more detailed discussion is included in Section 6 of this memorandum.

4. Facility Classification

The Idaho Power Salmon Substation is not a major facility as defined in IDAPA 58.01.01.006.55. It is not a designated facility as defined in IDAPA 58.01.01.006.27. The Standard Industrial Classification code is 4911 --Electrical Services--"Establishments engaged in the generation, transmission and/or distribution of electrical energy for sale."

The Aerometric Information Retrieval System (AIRS) facility classification is "B" because the actual or controlled potential to emit is less than 100 tons per year. The project is not subject to Title V requirements since the potential to emit is less than the major source threshold of 100 tons per year for any one regulated pollutant located in an attainment or unclassifiable area.

5. Area Classification

The facility is located within Lemhi County in the northern portion of the Idaho Falls regional district. Lemhi County is designated as an attainment or unclassifiable area for all regulated criteria air pollutants. Lemhi County is located in Air Quality Control Region 63 and Zone 12.

6. Regulatory Review

This OP is potentially subject to the following permitting requirements:

IDAPA 58.01.01.006.55.a.i Major Facility

A major facility is defined as any facility which emits, or has the potential to emit, 100 tons per year or more of any regulated air pollutant. Idaho Power has requested a permitted emission limit of approximately 99 tons per year of NO_x, a regulated air pollutant, from the Salmon Substation. Therefore, the Salmon Substation is not defined as a major facility.

IDAPA 58.01.01.161 Toxic Substances

DEQ will ensure that any TAP shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.

IDAPA 58.01.01.401.03.a Tier II Operating Permits Required By The Department

A Tier II OP was required for the Salmon Substation by DEQ to attain or maintain ambient air quality standards.

IDAPA 58.01.01.402 Application Procedures

The facility is subject to the general application procedures listed in IDAPA 58.01.01.402.

IDAPA 58.01.01.402.02.c Additional Specific Information

The facility is required to include a description of the proposed monitoring and recordkeeping that will be used to verify compliance with the restriction on potential to emit. The facility has proposed to monitor monthly fuel usage to verify compliance with the restriction to limit NO_x emissions to 249 tons per year. The 12-month rolling average diesel fuel usage will be limited to 492,492 gallons for Generator West and 494,853 gallons for Generator East.

¹ Standard Industrial Classification Manual, Executive Office of the President, Office of Management and Budget, 1987.

IDAPA 58.01.01.403

Permit Requirements For Tier II Sources

The generators at the Salmon Substation were demonstrated to comply with local, state, or federal emission standards and NAAQS as required in IDAPA 58.01.01.403. See Tables 1 and 2 above and Appendix B.

IDAPA 58.01.01.406

Obligation To Comply

The facility is required to comply with all applicable local, state, and federal rules and regulations.

IDAPA 58.01.01.470

Permit Application Fees For Tier II Permits

The facility is required to submit a permit application fee of \$500.

IDAPA 58.01.01.510 – 516

Stack Heights and Dispersion Techniques

The provisions of IDAPA 58.01.01.510 through 516 do not apply to stack heights in existence on or before December 31, 1970. The generators were constructed in 1967; therefore, they are not subject to the provisions in Sections 510 through 516.

IDAPA 58.01.01.577

Ambient Air Quality Standards For Specific Air Pollutants

Emissions of pollutants listed in IDAPA 58.01.01.577 were shown to be in compliance with the Ambient Air Quality Standards. See Table 2 above and Appendix C.

IDAPA 58.01.01.161

Toxic Substances

EPA AP-42 emissions factors were used to estimate TAP emissions for this project. The emission rates were compared against the screening level emission rates for each specific TAP as listed in IDAPA 58.01.01.585 and 586. For instances where the estimated emission rate of a TAP exceeded the screening level, the ambient impact was derived using a refined model. The estimated emission rate was then multiplied by the ISCST3 modeling demonstration's maximum ambient impact value to determine whether the proposed project's impact was within acceptable risk as to not injure or unreasonably affect human or animal life or vegetation as stated in IDAPA 58.01.01.161. The ambient impacts for the TAPs are below the acceptable ambient concentrations listed in IDAPA 58.01.01.586. Since the acceptable ambient concentrations listed in IDAPA 58.01.01.586 are based on an excess risk of one in a million, the risk for this facility-wide analysis is acceptable.

Table 3: Toxic Air Pollutant Emissions-Ambient Impact Compliance Demonstration

TAPs ¹	Hourly Emissions Rate For Two Generators	Generators' Ambient Impact From Modeling	AACC Per IDAPA 58.01.01.586
	(lb/hr) ³	(µg/m ³) ⁴	(µg/m ³) ²
Benzene	4.252E-02	0.0035	0.12
Benzo(a)pyrene	1.41E-03	0.000001	0.0003
Formaldehyde	4.32E-06	0.0005	0.077

1. TAPs = Toxic air pollutants

2. AACC = Allowable Ambient Concentration for Carcinogens

3. lb/hr = Pounds per hour

4. µg/m³ = Micrograms per cubic meter

Compliance with the TAP increments has been demonstrated for each TAP emitted for this project. The computer modeling results were used to graphically represent the predicted worst-case concentrations in the immediate area. Please refer to Appendix D for further information regarding modeling.

IDAPA 58.01.01.625

Visible Emissions

The generators at the Salmon Substation will not discharge any pollutant into the atmosphere for a period or periods aggregating more than three minutes in any 60-minute period which is greater than 20 % opacity as determined by EPA Test Method 9.

IDAPA 58.01.01.650

Rules For Control Of Fugitive Dust

The facility is required to take all reasonable precautions to prevent the generation of fugitive dust.

IDAPA 58.01.01.677

Standards For Minor And Existing Sources

A person shall not discharge into the atmosphere from any fuel burning equipment in operation prior to October 1, 1979, PM in excess of 0.050 grains per dry standard cubic foot (gr/dscf) corrected to 3% oxygen. Based on the source test discussed in Section 2 of this technical memorandum and in Appendix A, the PM emissions corrected to 3% oxygen from Generator West are 0.029 gr/dscf, and the emissions from Generator East are 0.016 gr/dscf. These emissions rates are in compliance with IDAPA 58.01.01.677.

IDAPA 58.01.01.728

Distillate Fuel Oil

The facility will not use any No. 1 distillate fuel oil with a sulfur content of greater than 0.3% by weight, nor No. 2 distillate fuel oil with a sulfur content of greater than 0.5% by weight.

40 CFR §60

New Source Performance Standards

No applicable New Source Performance Standards are contained in 40 CFR §60.

40 CFR §61 and §63

National Emission Standards for Hazardous Air Pollutants and Maximum Achievable Control Technology

No subparts of 40 CFR §61 or §63 are applicable to diesel generators.

7. Permit Requirements

7.1 Emission Limits

Emission limits on specific air pollutants are not required because the emissions units will not violate any ambient standard when operated at its potential to emit. However, allowable emissions are provided in the permit for the purpose of managing air quality, and the permit treats these emissions as emission limits. The emissions rates listed in the Tier II OP appendix are estimated maximum emissions from the generators when operated at their potential to emit. The operation of the generators is limited to 392,392 gallons of diesel fuel burned per 12 months for both generators. The annual (tons per year) emissions rates reflect that limitation.

7.2 Operating Requirements

The generators are allowed to burn No. 1 or No. 2 distillate fuel.

The generators are allowed to burn a maximum of 392,392 gallons of No. 1 and/or No.2 distillate fuel per 12-month period.

Fuel will be burned at a rate not exceeding 201 gallons per hour per generator.

7.3 Monitoring, Recordkeeping, and Reporting Requirements

The total fuel usage in gallons burned in each generator at the Salmon Substation will be monitored and recorded on a monthly basis. This information shall be kept onsite for the most recent two-year period and shall be made available to DEQ representatives upon request. The fuel usage in gallons burned per month will be submitted to DEQ in a semi-annual report.

Records from the fuel oil supplier shall be maintained onsite. These records shall include certifications that all No. 1 distillate and all No. 2 distillate fuel received for use or used in the generators did not exceed 0.3% sulfur by weight or 0.5% sulfur by weight, respectively.

Records of all fugitive dust complaints received shall be maintained onsite. Appropriate corrective action will be taken as expeditiously as practicable after a valid complaint is received.

8. AIRS Information

AIRS/AFS¹ FACILITY-WIDE CLASSIFICATION² DATA ENTRY FORM

Air Program Description	SIP ³	PSD ⁴	NESHAP ⁵ (Part 61)	NSPS ⁶ (Part 60)	MACT ⁷ (Part 63)	TITLE V	AREA CLASSIFICATION
							A – Attainment U – Unclassifiable N – Nonattainment
SO ₂ ⁸	B						U
NO _x ⁹	SM	SM					U
CO ¹⁰	SM						U
PM ₁₀ ¹¹	B						U
PM ¹²	B						U
VOC ¹³	B						U
Total HAPs ¹⁴	B						
			APPLICABLE SUBPART				

1. Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

2. AIRS/AFS CLASSIFICATION CODES:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For NESHAP only, class "A" is applied to each pollutant which is below the 10 ton-per-year (T/yr) threshold, but which contributes to a plant total in excess of 25 T/yr of all NESHAP pollutants.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

3. State Implementation Plan

4. Prevention of Significant Deterioration

5. National Emission Standards for Hazardous Air Pollutants

6. New Source Performance Standards

7. Maximum Achievable Control Technology

8. Sulfur Dioxide

9. Nitrogen Oxides

10. Carbon Monoxide

11. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers

12. Particulate Matter

13. Volatile Organic Compounds

14. Hazardous Air Pollutants

VE/FE/FD (Visible Emissions, Fugitive Emissions, and Fugitive Dust) are entered for compliance purposes only and do not require evaluation by the permit engineer.

FEES

The AIRS facility classification for this facility is "B" because the uncontrolled potential to emit is less than 100 T/yr; therefore, this facility is not subject to permit application fees other than the \$500 Tier II OP application fee.

RECOMMENDATIONS

Based on the review of the application materials and all applicable state and federal regulations, staff recommends that DEQ issue a Tier II OP to the Idaho Power Salmon Substation.

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APPENDIX A

IDAHO POWER COMPANY SALMON SUBSTATION SOURCE TESTING MEMORANDUM

Memo

To: Mike Stambulis
From: Stephen Coe
Date: October 18, 2001
Re: Idaho Power Generators #1 & #2 (Salmon, ID) Source Testing

Mike,

Bison Engineering, Inc. submitted a source test report for two Idaho Power generators (2.75 MW each) located in Salmon, ID, on August 9, 2001. Bison source tested the generators for Particulate Matter (PM), Nitrogen Oxides (NO_x), Sulfur Dioxide (SO₂), and Carbon Monoxide (CO). The testing was conducted on June 13 and 14, 2001. The purpose of this testing was to establish emission factors to be incorporated in the operating permit.

The source test report followed the department-approved protocol for this source test. All the testing equipment appears to have been properly calibrated and maintained. The source tests followed the EPA reference methods and the agreed upon protocol. The raw testing data is in order and appears to be complete.

It is my recommendation that this source testing data is sufficient to satisfy any source testing requirements, which would have been included in the permit. Additionally this testing report is acceptable to determine emission factors for permitting the generators.

APPENDIX B

IDAHO POWER COMPANY SALMON SUBSTATION EMISSIONS CALCULATIONS

CRITERIA POLLUTANTS

TABLE 1. MAXIMUM EMISSION RATES FOR ONE GENERATOR

Pollutant	12-Month Operating Hours	Max. Hourly Emission Rate (lb/hr)	Max. Annual Emission Rate (tons/yr)	Short Term Emission Rate (g/sec)	Max. Hourly Fuel Consumption (gallons)	Max. Allowable Annual Fuel Consumption (gallons)
NOx	4,920	101.22	249.00	12.8	200.2	984,984
SO2	4,920	6.55	16.1	0.825	200.2	984,984
PM	4,920	5.03	12.4	0.634	200.2	984,984
CO	4,920	23.92	58.84	3.01	200.2	984,984

Note: Maximum hourly emission rates calculated using results from source test.

Calculations based on maximum emissions and fuel consumption of Generator West.

Hourly fuel consumption rates established from source test.

TABLE 2. MAXIMUM HOURLY AND ANNUAL EMISSIONS FOR TWO GENERATORS

Pollutant	Max. Hourly Emission Rate (lb/hr)	Max. Annual Emission Rate (tons/yr)
NOx	198.1	249.0
SO2	12.6	16.1
PM-10	8.09	12.4
CO	41.79	58.84

Note: PM emissions assumed to be 100% PM10

Maximum hourly emissions based on simultaneous operation of both generators.

Maximum annual emissions based on operation of both generators using up to 984,984 gallons of fuel.

TOXIC AIR POLLUTANTS (TAPs)

TABLE 3. TAP HOURLY EMISSIONS

Pollutant	Emission Factor (lb/MMBTU)	Hourly Emissions from Two Generators (lb/hr)	Screening Levels (lb/hr)	Model (Y/N)
Acetaldehyde	2.52E-05	1.38E-03	3.03E-03	N
Acrolein	7.88E-06	4.32E-04	1.70E-02	N
Benzene	7.76E-04	4.25E-02	8.00E-04	Y
Benzo(a)pyrene	2.57E-07	1.41E-05	2.00E-06	Y
Fluorene	1.28E-05	7.01E-04	1.33E-01	N
Formaldehyde	7.89E-05	4.32E-03	5.10E-04	Y
Naphthalene	1.30E-04	7.12E-03	3.33	N
Toluene	2.81E-04	1.54E-02	25	N
Xylenes	1.93E-04	1.06E-02	29	N

Notes: Emission factors from AP-42, Tables 3.4-3.4

Hourly emissions calculated using maximum heat input of 54.8 MMBTU/hr for two generators

Example Calculation: $200 \text{ gal/hr} \times 7.1 \text{ lb/gal} \times 19,300 \text{ BTU/lb} \times 2/1,000,000 = 54.8 \text{ MMBTU/hr}$

where: 200 gal/hr is the maximum fuel input per generator

7.1 lb/gal and 19,300 BTU/hr are average density and heating value for distillate fuel oil per AP-42, Section 3.4

APPENDIX C

IDAHO POWER COMPANY

SALMON SUBSTATION

TANKS 4.0 OUTPUT

TANKS 4.0
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	AST No. 1
City:	Salmon
State:	Idaho
Company:	Idaho Power Company
Type of Tank:	Horizontal Tank
Description:	12,000 gallon diesel AST

Tank Dimensions

Shell Length (ft):	22.00
Diameter (ft):	10.00
Volume (gallons):	12,000.00
Turnovers:	22.29
Net Throughput (gal/yr):	267,500.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: Missoula, Montana (Avg Atmospheric Pressure = 13.12 psia)

TANKS 4.0 Emissions Report - Detail Format Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F)			Liquid Bulk Temp. (deg F)	Vapor Pressures (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Distillate fuel oil no. 2	All	45.90	40.17	51.64	44.32	0.0040	0.0033	0.0049	130.0000			168.00	Option 5: A=12.101, B=6907

TANKS 4.0 Emissions Report - Detail Format Detail Calculations (AP-42)

Annual Emission Calculations	
Standing Losses (lb):	1.5805
Vapor Space Volume (cu ft):	1,100.5579
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0409
Vented Vapor Saturation Factor:	0.9989
Tank Vapor Space Volume	
Vapor Space Volume (cu ft):	1,100.5579
Tank Diameter (ft):	10.0000
Effective Diameter (ft):	16.7408
Vapor Space Outage (ft):	5.0000
Tank Shell Length (ft):	22.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Daily Avg. Liquid Surface Temp. (deg. R):	505.5746
Daily Average Ambient Temp. (deg. F):	44.2958
Ideal Gas Constant R (psia cu ft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	503.9658
Tank Paint Solar Absorptance (Shell):	0.1700
Daily Total Solar Insolation Factor (Btu/sq ft day):	1,189.5774
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0409
Daily Vapor Temperature Range (deg. R):	22.9244
Daily Vapor Pressure Range (psia):	0.0018
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0033
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0049
Daily Avg. Liquid Surface Temp. (deg R):	505.5746
Daily Min. Liquid Surface Temp. (deg R):	489.8435
Daily Max. Liquid Surface Temp. (deg R):	511.3057
Daily Ambient Temp. Range (deg. R):	23.9750
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9989
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Vapor Space Outage (ft):	5.0000
Working Losses (lb):	
Working Losses (lb):	3.3281
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Annual Net Throughput (gal/yr.):	267,500.0000
Annual Turnovers:	22.2917
Turnover Factor:	1.0000
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000

TANKS 4.0
Emissions Report - Detail Format
Detail Calculations (AP-42)- (Continued)

Total Losses (lb): 4.9086

TANKS 4.0
Emissions Report - Detail Format
Individual Tank Emission Totals

Annual Emissions Report

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	3.33	1.58	4.91

TANKS 4.0
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	AST No. 2
City:	Salmon
State:	Idaho
Company:	Idaho Power Company
Type of Tank:	Horizontal Tank
Description:	12,000 gallon diesel AST

Tank Dimensions

Shell Length (ft):	22.00
Diameter (ft):	10.00
Volume (gallons):	12,000.00
Turnovers:	22.29
Net Throughput (gal/yr):	267,500.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: Missoula, Montana (Avg Atmospheric Pressure = 13.12 psia)

TANKS 4.0
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F)			Liquid Bulk Temp. (deg F)	Vapor Pressures (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Distillate fuel oil no. 2	All	45.90	40.17	51.64	44.32	0.0040	0.0033	0.0049	130.0000			186.00	Option 5: A=12.101, B=6907

TANKS 4.0 Emissions Report - Detail Format Detail Calculations (AP-42)

Annual Emission Calculations	
Standing Losses (lb):	1.5805
Vapor Space Volume (cu ft):	1,100.5579
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0409
Vented Vapor Saturation Factor:	0.9989
Tank Vapor Space Volume	
Vapor Space Volume (cu ft):	1,100.5579
Tank Diameter (ft):	10.0000
Effective Diameter (ft):	16.7408
Vapor Space Outage (ft):	5.0000
Tank Shell Length (ft):	22.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Daily Avg. Liquid Surface Temp. (deg. R):	505.5746
Daily Average Ambient Temp. (deg. F):	44.2958
Ideal Gas Constant R (psia cu ft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	503.9858
Tank Paint Solar Absorptance (Shell):	0.1700
Daily Total Solar Insulation Factor (Btu/sq ft day):	1,189.5774
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0409
Daily Vapor Temperature Range (deg. R):	22.9244
Daily Vapor Pressure Range (psia):	0.0018
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0033
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0049
Daily Avg. Liquid Surface Temp. (deg R):	505.5746
Daily Min. Liquid Surface Temp. (deg R):	499.6435
Daily Max. Liquid Surface Temp. (deg R):	511.3057
Daily Ambient Temp. Range (deg. R):	23.9750
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9989
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Vapor Space Outage (ft):	5.0000
Working Losses (lb):	
Working Losses (lb):	3.3281
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Annual Net Throughput (gal/yr.):	267,500.0000
Annual Turnovers:	22.2917
Turnover Factor:	1.0000
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000

TANKS 4.0
Emissions Report - Detail Format
Detail Calculations (AP-42)- (Continued)

Total Losses (lb):

4.9086

TANKS 4.0
Emissions Report - Detail Format
Individual Tank Emission Totals

Annual Emissions Report

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	3.33	1.58	4.91

APPENDIX D

IDAHO POWER COMPANY SALMON SUBSTATION MODELING MEMORANDUM

MEMORANDUM

TO: Michael Stambulis, State Office of Technical Services
FROM: Mary Anderson, Air Quality Modeler, State Office of Technical Services
SUBJECT: Modeling Review for the Tier II Operating Permit Application; Idaho Power in Salmon, Idaho
DATE: October 24, 2001

1. SUMMARY:

Kleinfelder, Inc., on behalf of Idaho Power Company, Inc. (Idaho Power), submitted a Tier II operating permit (Tier II) application for the facility in Salmon, Idaho. The Tier II application addresses the operation of two diesel-fueled 2.75 megawatt electric generators. The purpose of the Tier II is to limit the number of generator hours such that emissions of oxides of nitrogen (NO_x) are below 250 tons per year. The Tier II application addresses all pollutants on a facility-wide basis. The criteria pollutants of concern for this facility are particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM₁₀), NO_x, sulfur dioxide (SO₂), and carbon monoxide (CO). There are no ambient air quality standards for toxic air pollutants (TAPs) for use in Tier II permitting actions. However, under IDAPA 58.01.01.161, the Department of Environmental Quality (DEQ) will ensure that any TAP "shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation." The Tier II permitting process requires those emissions that exceed the screening emission level presented in IDAPA 58.01.01.585 and .586 be modeled. For this facility, the following TAPs were identified: benzene, formaldehyde, and benzo(a)pyrene. The modeling analysis provided by Kleinfelder, Inc. demonstrated compliance with all regulatory requirements and the quantities of TAPs emissions were determined to not unreasonably affect human or animal life or vegetation.

2. DISCUSSION:

2.1 Applicable Air Quality Impact Limits

This facility is located in Lemhi County, which is designated an attainment or unclassifiable area for all criteria pollutants. Therefore, total ambient impacts, including background, for this criteria pollutant must be below the National Ambient Air Quality Standards (NAAQS), listed in Table 1. As stated above, there are no ambient air quality standards for TAPs. Therefore, they are not listed in Table 1.

Table 1. Applicable regulatory limits

Pollutant	Averaging Period	Regulatory Limit¹ (µg/m³)²
Oxides of nitrogen	Annual	100
Sulfur dioxide	3-hour	1,300
	24-hour	375
	Annual	80
Carbon monoxide	1-hour	40,000
	8-hour	10,000
	24-hour	150
PM ₁₀ ³	24-hour	150
	Annual	50

¹ IDAPA 58.01.01.577

² Micrograms per cubic meter

³ Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

2.2 Background Concentrations

There are no monitors located in the Salmon area for the criteria pollutants of concern for this project. Therefore, statewide background concentrations were used. These concentrations are presented in Table 2. There are no background concentrations available for TAPs:

Table 2. Background concentrations

Pollutant	Averaging Period	Background Concentration ($\mu\text{g}/\text{m}^3$) ¹
Oxides of nitrogen	Annual	40
	3-hour	374
Sulfur dioxide	24-hour	120
	Annual	18.3
Carbon monoxide	1-hour	11,450
	8-hour	5,130
PM ₁₀ ²	24-hour	86
	Annual	32.7

¹ Micrograms per cubic meter

² Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

2.3 Modeling Impact Assessment

On August 2, 2001, Idaho Power submitted a Tier II application for its facility in Salmon, Idaho. The pollutants of concern for this facility are PM₁₀, NO_x, SO₂, CO, benzene, formaldehyde, and benzo(a)pyrene. Kleinfelder used the most current version of ISCST3, an approved U.S. Environmental Protection Agency model. Kleinfelder assumed rural dispersion and accounted for complex terrain surrounding the facility. Meteorological data from the national weather service station at the Missoula/Johnson Bell Airport (surface data) and the Spokane Airport (upper air data) were used for the years 1987 through 1991. This meteorological data was determined to be acceptable for this facility. The receptor grid used included a 1.5 kilometer (km)-by-1.5 km, 100 meter (m) resolution grid approximately centered on the facility. Receptors were also placed at the property boundary at 25-m intervals. The property boundary is determined to be the ambient air boundary because Idaho Power has posted "NO TRESSPASSING" signs around the property line perimeter. DEQ agrees with the determined ambient air boundary.

Table 3 lists the source parameters used by Kleinfelder in the analysis. The emission rates used in the ambient air assessment are presented in Table 4.

Table 3. Source parameters

Source	Generator - West	Generator - East
Exit temperature (°F) ¹	684	725
Exit flow rate (acfm) ²	33,836	33,388
Exit diameter (feet)	2.67	2.67
Height (feet)	20	20

¹ Degrees Fahrenheit

² Actual cubic feet per minute

Table 4. Pollutant emission rates for Generators West and East

Pollutant	Generator - West		Generator - East	
	Maximum Hourly Emission Rate ¹ (lb/hr) ²	Annual Hourly Emission Rate ³ (lb/hr)	Maximum Hourly Emission Rate (lb/hr) ¹	Annual Hourly Emission Rate (lb/hr)
PM ₁₀ ⁴	5.03	1.41	3.06	0.86
Sulfur dioxide	6.55	1.85	6.00	1.77
Oxides of nitrogen	101.22	28.54	96.83	28.52
Carbon monoxide	23.92	6.74	17.87	5.26
Benzene	2.02E-02	5.56E-03	2.02E-02	5.56E-03
Formaldehyde	2.05E-03	7.94E-04	2.05E-03	7.94E-04
Benzo(a)pyrene	6.69E-06	1.59E-06	6.69E-06	1.59E-06

¹ Emission rate used for 24-hour or shorter averaging periods

² Pounds per hour

³ Emission rate used for annual averaging period

⁴ Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

3. MODELING RESULTS:

The ambient impacts and the comparison to the NAAQS are listed in Table 5. The modeling results presented in Table 5 differ slightly from the information in the application. This is due to the fact that Kleinfelder used the highest first high value when adding to the background and comparing to the NAAQS. This is a more conservative approach. However, only the highest second high value needs to be used for 24-hour or shorter averaging periods. This is the value presented in Table 5. The ambient impacts for the TAPs are below the acceptable ambient concentrations listed in IDAPA 58.01.01.586. Since the acceptable ambient concentrations listed in IDAPA 58.01.01.586 are based on an excess risk of one in a million, the risk for this facility-wide analysis is acceptable.

Table 5. Ambient impacts for the entire facility.

Pollutant	Averaging Period	Ambient concentration ($\mu\text{g}/\text{m}^3$)¹	Background Concentration ($\mu\text{g}/\text{m}^3$)	Total Ambient Concentration ($\mu\text{g}/\text{m}^3$)	Regulatory Limit² ($\mu\text{g}/\text{m}^3$)	Compliant (Y or N)
Oxides of nitrogen	Annual	18.0	40	58.0	100	Y
Sulfur dioxide	3-hour	191.98	374	565.98	1,300	Y
	24-hour	34.76	120	154.76	375	Y
	Annual	1.14	18.3	19.44	80	Y
Carbon monoxide	1-hour	1038.88	11,450	12,488.88	40,000	Y
	8-hour	319.37	5,130	5449.37	10,000	Y
PM ₁₀ ³	24-hour	22.37	86	108.37	150	Y
	Annual	0.71	32.7	33.41	50	Y
Benzene	Annual	0.0035		0.0035	N/A ⁴	Y
Formaldehyde	Annual	0.0005		0.0005	N/A	Y
Benzo(a)pyrene	Annual	0.000001		0.000001	N/A	Y

¹. Micrograms per cubic meter

². IDAPA 58.01.01.577

³. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

⁴. There are no ambient air quality standards for TAPs in the Tier II permitting process.

Electronic copies of the modeling analysis are saved on disk. Mike Stambulis reviewed this modeling memo to ensure consistency with the permit and technical memorandum.

MA:bm G:\AHWMANDERSOMTIER I\IDAHO POWER SALMON\MODELING TECH MEMO.DOC

ABBREVIATED AIRS DATA ENTRY SHEET

Name of Facility:

Idaho Power-Salmon Substation

AIRS/Permit #:

Project # 12-018907 Permit Number 059-00007

Permit Issue Date:

Issued to public comment on 11/16/01

*Source/Emissions Unit Name (25 spcs)

(Please use name as indicated in permit)

SCC #

(8 digit #)

Air Program

(SIP/NESHAP/
NSPS/PSD/
MACT)

* Generators East and West

20100101

SIP

RETURN TO PAT RAYNE
AIRS-PT.LST (6/01)